Educational Pairings, Motherhood, and Women's Relative Earnings in Europe

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Abstract As a consequence of the reversal of the gender gap in education, the female partner in a couple now typically has as much as or more education than the male partner in most Western countries. This paper addresses the implications for the earnings of women relative to their male partners in 16 European countries. Using the 2007 and 2011 rounds of the EU-SILC (N=58,292), we investigate to what extent international differences in women's relative earnings can be explained by educational pairings and their interaction with the motherhood penalty on women's earnings, by international differences in male unemployment, or by cultural gender norms. While we find that the newly emerged pattern of hypogamy is associated with higher relative earnings for women in all countries and that the motherhood penalty on relative earnings is considerably lower in hypogamous couples, it cannot explain away international country differences. Similarly, male unemployment is associated with higher relative earnings for women, but cannot explain away the country differences. Against expectations, we find that the hypogamy bonus on women's relative earnings, if anything, tends to be stronger rather than weaker in countries that exhibit more conservative gender norms.

Keywords: marriage; union formation; educational assortative mating; income; gender roles; educational inequality; household economics

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Introduction

Universities largely remained a male domain until well into the second half of the twentieth century. Male enrollment and completion rates in advanced education were higher than female rates virtually everywhere. Since the 1990s, however, there are more women than men enrolled in college level education, and they also graduate more successfully (Buchmann and DiPrete 2006; Esteve et al. 2016).

The reversal of the gender gap in education implies that, for the first time in history, there are more highly educated women than highly educated men reaching the ages of partnering and parenthood. Recent studies have shown that the gender-specific trends in educational enrollment have indeed undermined the traditional pattern of educational hypergamy (women marrying up). Hypogamy (women marrying down) has become more prevalent than hypergamy in most countries where the reversal of the gender gap in education has occurred (Esteve et al. 2012; 2016; Grow and Van Bavel 2015; De Hauw, Grow and Van Bavel 2017).

Here we investigate how the new pattern of educational assortative mating shapes the relative contribution of partnered women to the joint couple income across European countries. Drawing on the European Union's Statistics on Income and Living Conditions (EU-SILC), we attempt to explain country differences in women's relative earnings, compared to their male partners, by accounting for compositional differences on the micro level in terms of educational pairings and parenthood, and the interaction between these two. After accounting for these micro-level factors, we investigate to what extent the remaining country differences can be explained by male unemployment and country-level gender norms.

The interplay between the relative education and relative earnings of female and male partners is an important topic for family demography because of its potential implications for fertility and divorce (Van Bavel 2012; Schwartz and Han 2014; Esteve et al. 2016). A switch from hypergamy to hypogamy is expected to affect women's contribution to the joint couple income. If the female partner has more education than her male partner, she will tend to have a higher earning potential in the paid labor market (Winkler 1998; Winkler et al. 2005; Wang et al. 2013). Theoretically this should affect the decision-making processes concerning both partners' labor market participation and thus the timing and quantum of fertility (Van Bavel 2012).

Studies have consistently reported that mothers tend to scale down their paid labor market activity and earn less income after childbirth (Budig and England 2001; Budig et al. 2012). Yet, a recent study by Klesment and Van Bavel (2017) showed that such motherhood penalty may be modified by the relative education of the partners. The authors found that college-educated mothers of school-age children with less educated partners are about as likely to be the main breadwinners as college-educated childless women who are with a similarly educated partner. The Klesment and Van Bavel (2017) study has a number of limitations, however. First, it focuses on a rather crude measure of relative earnings, namely whether or not the wife is earning more than half of the joint couple income. We offer a more nuanced approach here, addressing the full continuum of the female partner's relative income rather than grouping it into broad categories. Second, the earlier study is based on gross income measures. This may yield misleading results because couples in Europe may be taxed differently from country to country depending on the relative earnings of each partner. The current paper therefore uses net income data, after taxation (which varies a lot across Europe). Third, the earlier study did not include unemployment and sick leave benefits. Since such benefits are linked to employment in European welfare states, leaving them out may

yield a distorted picture of the importance of his and her employment career for the family budget. We therefore include these benefits here. Finally, the earlier paper only looked at the overall picture in the pooled sample of all countries. The current study aims to explore country differences. The primary question here is to what extent international differences in women's relative earnings can be explained by compositional differences in women's relative education. To following section derives hypotheses from the relevant background literature.

Background

The male breadwinner – female homemaker family model refers to the situation where he earns (almost) all the income and she allocates most of her time to childcare and household work. In contrast, the dual-earner model refers to families where both partners earn a significant if not equal share of the family income (Nock 2001; Raley et al. 2006). In this section, we formulate a set of hypotheses about how the female contribution to the couple's joint earnings depends on educational assortative mating and its interaction with the motherhood status, and about macro-level factors that may account for cross-country variation in women's relative earnings.

Educational assortative mating

Differences between the earnings of spouses are partly driven by their relative human capital. The traditional male breadwinner model was linked with educational hypergamy. Yet, with the expansion of female participation in college level education, educational homogamy became the modal marriage pattern in most Western countries over the course of the 20th century (Mare 1991; Kalmijn 1991; Schwartz and Mare 2005; Blossfeld 2009; Schwartz 2013). Correspondingly, dual-income households became the norm, but with the share of the male partner in the joint income

typically largely exceeding the share of the female partner (Blossfeld and Timm 2003; Blossfeld 2009; Buss et al. 2001; Raley et al. 2006; Schwartz 2013; Winkler et al. 2005).

The reversal of the gender gap in education implies that there are more highly educated women than men entering the marriage market. Some of the highly educated women will have to either remain single or select a partner with less education. Recent evidence indeed shows that hypogamy has become more prevalent than hypergamy in many countries, including the US and most European countries (Esteve et al. 2012; Grow and Van Bavel 2015; De Hauw et al. 2017). Our baseline hypothesis is that a women's relative education is positively associated with her relative earnings in the couple (*Hypothesis 1*). That is, women who are in hypogamous partnerships will have higher relative earnings than those who are in other pairing types. If that is indeed that case, compositional differences in educational pairings might at least partially explain country differences in women's relative earnings.

Motherhood and relative income

Women with children earn less, both compared to their male partners and compared to women without children. The presence of dependent children tends to lead to lower involvement in the paid labor market and, hence, lower relative earnings (Budig and England 2001; Gangl and Ziefle 2009; Budig et al. 2012; Dotti Sani 2015). Several explanations for this motherhood penalty have been advanced, including selection effects as well as causal mechanisms (Waldfogel 1998; Budig and England 2001; Anderson et al. 2002; Petersen et al. 2010). Selection effects involve cases where women who are more family-oriented opt out of better paying but competitive and time-consuming careers in order to spend more time with their children (Hakim 2003; Chevalier 2007; Lück and Hofäcker 2008). However the lower earnings of mothers may also be caused directly by

the fact that following childbirth most women at least temporarily retreat from paid work (Stier et al. 2001; OECD 2011; Budig et al. 2012). Thus motherhood implies an opportunity cost via reduced income, at the same time that the household need for income rises with the significant costs that children entail.

The extent of retreat from the labor market after entry into parenthood is expected to depend on his and her income potential which is determined in part by the partners' education. Both the level and the field of education affect income potential (Van Bavel 2010), but since our data lack information on field of study, we only consider educational attainment. For both men and women with lower levels of attainment, the gains from labor market activity and the opportunity costs of staying at home are relatively low. While the need for additional income might produce the incentive to work more hours in paid labor, the opportunity costs of staying at home to provide childcare are low. For those with higher levels of education, the gains from paid labor and the opportunity costs of staying at home are higher. Parents with greater earning potential would need less work hours to achieve a given income level, but they will also lose more financially by staying at home (Mincer 1963; Becker 1993). Research in wealthy countries has typically found the opportunity costs predominating for women and the income effect for men (England 2010).

Women more often stay at home when they have children, since the costs of outsourcing childcare undermine the incentives for paid labor, particularly among women with a low level of education. But when a woman has more education than her partner, the gender balance of income effects and opportunity costs may shift because she is then more likely to have a higher earning potential than her partner. In this case, her attachment to the labor market will be stronger because the income she generates is relatively more important to the family's standard of living. In micro-economic terms, if she has higher potential income than he, the opportunity costs of staying at

home to take care of children will tend to be relatively higher for her than for him. Among childless couples, the influence of opportunity costs is less critical, since there is no imperative to divide partners' time between paid work and childcare. We therefore expect that there is a smaller motherhood penalty on relative earnings in case of educational hypogamy and a larger motherhood penalty in case of hypergamy compared to homogamy (*Hypothesis 2*). If that is the case, compositional differences between countries in terms of the combined distribution of educational pairings and motherhood may explain at least part of the country gradient.

Male unemployment

Both economic and cultural factors may affect women's relative earnings. Male unemployment is a major economic factor because the share of the female partner in the joint couple income will obviously be higher when her male partner is unemployed (Chesley 2011; Bettio et al. 2013; Vitali and Arpino 2016). Therefore, the economic crisis in the wake of the 2008 financial crisis may have affected women's relative earnings due to high male unemployment rates independent of their relative education or any prevailing motherhood penalty. The hardest hit economic sectors tended to employ more men than women (like heavy industry) while sectors that were less affected tend to employ more women (like education). Recent evidence indeed suggests that women's relative income share increased in the wake of the 2008 financial crisis (Vitali and Mendola 2014; Klesment and Van Bavel 2015). In Europe, Bettio et al. (2013) found that the proportion of dual earner couples declined during the downturn while the share of female breadwinner couples increased to almost 10%. Similarly, in the US, Chesley (2011) sees the decline of men's employment as a major factor explaining the rise of breadwinner women. Vitali and Arpino (2016) found that regional male unemployment rates were positively associated with women's self-reported share in the

household income in Europe. Based on this, we expect that part of the country gradient in women's relative income is due to male unemployment. *Hypothesis 3* therefore states that the country gradient in women's relative earnings will be reduced after accounting for male unemployment.

Gender norms

International differences in women's relative earnings may also be due to cultural factors related to gender roles. Female labor market participation and earnings of mothers vary substantially across countries in accordance with prevailing gender role expectations and cultural family ideals (Stier et al. 2001; Harkness and Waldfogel 2003; Craig and Mullan 2010; Budig et al. 2012). The effect of gender role attitudes on relative earnings may be indirect as well as direct. In some countries, widespread reluctance to enrolling young children in formal childcare may prolong career interruptions after childbearing (Davies and Pierre 2005; Molina and Montuenga 2009; Lundberg and Rose 2000; Sigle-Rushton and Waldfogel 2007), especially lowering the earnings of mothers. Beliefs, values and attitudes about gender roles may also sustain gender inequality more directly (Pascall and Lewis 2004; Lewis 1992). Institutional arrangements hindering gender equality in the labor market (Lewis 1992; Neyer and Andersson 2008; Thévenon 2011) typically reflect cultural beliefs and attitudes that may underpin the male breadwinner–female homemaker family model (Janssens 1997; Pfau-Effinger 1998; Creighton 1999; Lewis 2001; Esping-Andersen 2009). Gender roles embedded in this family model are explicitly at odds with women earning more than their partners, and especially so if they have children. To the extent that such traditional views prevail, women may modify their labor supply in order to avoid a gender-role reversal in earnings. Hence, traditional gender attitudes may undermine the hypogamy bonus on relative earnings by preventing women to harvest the returns to education in the labor market. We therefore

expect the hypogamy bonus on relative earnings to be smaller in countries that have more conservative gender role attitudes (*Hypothesis 4*).

Data and methods

Sample selection

We use the European Union's Statistics on Income and Living Conditions (EU-SILC), an annual household survey collecting both cross-sectional and longitudinal data. In most countries, the survey applies a rotating panel design with a length of four waves. Each subsequent wave replaces part of the sample and the entire sample is renewed across a four year period (Atkinson and Marlier 2010). We analyze cross-sectional data from the 2007 and 2011 waves, ensuring that samples do not overlap. The income reference period is the year before the year of interview, so our income data cover earnings in 2006 and 2010, respectively. Our focus on woman's contribution to the joint *net* earnings of the couple requires limiting the study sample to the 16 countries that provide this measure (see Table 1).

We selected women who are living with a partner at the time of the survey, either married or unmarried, and who are aged 25 to 45. In order to be able to calculate the contribution of the female partner to the couple's combined income, only couples where at least one partner had earned some income were included. We include income both earned as an employee and through self-employment. Our measure incorporates unemployment benefits and sick leave benefits, which compensate for the temporary absence from the labor market (Dotti Sani 2015). After excluding individuals with missing information, couples without any earnings, and observations with extreme values of the relative earnings measure (see below), the study sample counts 58,292 couples

(30,702 in 2007 and 27,590 in 2011 respectively). Table 1 displays sample sizes per country included, along with basic descriptive statistics of the main variables featuring in the analysis.

<TABLE 1 Sample size and distribution of main variables by country about here>

Measures

Our main dependent variable is the women's relative income, defined as follows:

$$w_{ic}^{f} = \frac{y_{ic}^{f} - y_{ic}^{m}}{y_{c}^{m}} \qquad (1)$$

In this definition, y_{ic}^{f} represents the earnings of the female partner of couple *i* in country *c*, y_{ic}^{m} the earnings of the male partner in the same couple and country, and the denominator y_{c}^{m} represents the average earnings of men in that country. The relative income is standardized by the country's average male earnings to prevent scores from reflecting country differences in income level rather than gender difference because in high earning countries, the potential raw differences between his and her income are greater than in low income countries. Women's relative earnings, as defined in equation (1), therefore represent her relative earnings proportional to the average male earnings level in a given country. If he and she earn exactly the same amount, this variable equals zero. Positive values signify that she makes more money than he, negative values signify that she earns less than he. For example, a value of 0.10 means that she outearns him by 10% of the national male earnings; a value of –0.50 means that she earns 50% of the national male average earnings less than her partner. We excluded 118 observations with very extreme values: cases where her relative earnings were less than –5.00 (i.e., earnings difference between the spouses in favor of the man is five times the average male earnings) and 24 more where relative earnings are above +4.00

(earnings difference in favor of the woman is four times the average male earnings). Figure S1 in the online supplement plots the country-specific distributions of the dependent variable.

Our baseline Hypothesis 1 states that educational hypogamy is associated with higher relative earnings for women. In order to measure the educational attainment of the male and female partners, EU-SILC used a measure to facilitate international comparison, the ISCED-97 scale (UNESCO 2003). We collapsed this scale into three categories: low (ISCED levels 0–2, up to the second stage of basic education, equivalent to 7^{th} to 9^{th} grades in the US), medium (ISCED 3-4, secondary education or post-secondary but not tertiary; up to 12^{th} grades, vocational education, or junior and community colleges) and higher education (ISCED 5-6, university level bachelors, masters and PhD's). This strategy to employ broad categories implies a loss of information and obviously amplifies the level of educational homogamy, but it does ensure that the differences between categories corresponds to substantive differences in educational attainment in the European context.

Hypothesis 2 holds that the motherhood penalty on relative earnings will be smaller in case of educational hypogamy. In order to measure the motherhood status, we discern whether there are any children living in the couple's household. EU-SILC does not collect direct fertility information on the number of children ever born. Hence, what we will capture in this paper is really the effect of having a child living at home rather than the effect of parenthood per se.

Hypotheses 3 concerns male unemployment and EU-SILC provides individual-level data on the number of months spent in unemployment by males during the income reference period. We enter the months of unemployment in regression models as a continuous variable. Average values of the unemployment variable are shown in Table 1.

EU-SILC does not contain data that can be used to test Hypotheses 4 about attitudes towards gender roles. To obtain relevant indicators on the country level, we incorporate data from the European Social Survey (ESS), which samples people aged 15 and over for almost all European countries (Jowell et al. 2007). Two questions about conservative male breadwinner–female homemaker attitudes were asked in both rounds 2 and 5 (fieldwork around 2004 and 2010, respectively). Respondents were asked to indicate on a five-point scale whether they agreed (strongly), neither agreed nor disagreed, or (strongly) disagreed with the following statements: "Women should be prepared to cut down on paid work for sake of family", and "Men should have more right to job than women when jobs are scarce". We calculated the percentages agreeing or strongly agreeing with these items and took the average of the two ESS rounds. Bulgaria and Lithuania participated in round 5 and not in round 2, while for Italy and Luxembourg the pattern was reversed, so we could only use data for one survey year for these four countries. Table 1 gives country-specific means of both ESS variables.

As control variables, we included the woman's age and age-squared in years, a dummy variable for the year of income reference period (2006 versus 2010), and the absolute level of the couple's joint earnings (since women in poorer families tend to be more often the main earners, see Winslow-Bowe 2006), in the form of country-specific quartiles.

Analytic strategy

Our hypothesis testing involved fitting linear models with country fixed effects and with standard errors adjusted to account for the clustering at the country level. Additionally, we have also fitted binary logistic versions of our fixed effects models with the dependent variable redefined as the probability that the female earns more than her male partner. Details about the binary approach are

reported in the online supplement but the picture that emerges from it is the same as the one reported here.

We first test whether the woman's relative earnings are associated with being in a hypergamous, hypogamous, or homogamous union, controlling for her own level of educational attainment (Hypothesis 1). Next we test whether the motherhood penalty on relative earnings is smaller in hypogamous unions compared to other union types (Hypothesis 2) by including an interaction term between motherhood and the educational pairing variable. For Hypothesis 3, we test whether the variance of the country fixed effects becomes smaller after adding a measure of male unemployment to the model. Finally, we evaluate the correlation between the country level indicators for conservative gender role attitudes on the one hand, and the country specific effects of hypogamy on women's relative earnings (Hypothesis 4). Given the limited number of countries that could be included from the EU-SILC data, fitting a multilevel model with both individual- and country-level variables was not feasible. Instead we interacted country effects with the effect of educational pairings to obtain country-specific estimates of the effect of educational hypogamy and hypergamy compared to homogamy.

Results

Table 1 gives basic descriptive statistics about the distribution of couples by type of educational pairing in each country. Equally educated couples are the majority of the sample in every country. Among heterogamous unions, hypogamy is more common than hypergamy in all countries except Austria and Romania. The observation that hypogamy has become more prevalent than hypergamy confirms findings from other recent studies (Esteve et al. 2012; Grow and Van Bavel 2015; De Hauw et al. 2017).

Figure 1 shows women's relative earnings by educational pairing and country. Overall, across pairing types, women's relative earnings are lowest in Austria, Italy, Greece and Estonia (where women's earnings are lower than their partners' by about 50% of the national male average) and highest in Portugal, Sweden and Slovenia (gaps less than 35%). In all countries, women in hypogamous couples have higher relative earnings than women in homogamous or hypogamous couples, although the differences between pairing types are very small in Sweden. Figure 2 shows that mothers consistently have lower relative earnings than childless women in all countries.

<FIGURE 1 Mean relative earnings of women by educational pairing and country, about here>

<FIGURE 2 Mean relative earnings of women by motherhood status and country, about here>

Table 2 reports the estimates from the regression models. The baseline Model 1 contains only control variables: her age (centered around age 35), age squared, her educational level, the joint couple earnings, the income reference year, and country fixed effects. Unsurprisingly, higher educational attainment is associated with higher relative earnings by women. The couple's combined earnings are negatively correlated with relative income: the higher the joint earnings, the lower the woman's share tends to be. As expected from the economic climate of the period, women's relative earnings were somewhat higher in 2010 compared to 2006.

The country fixed effects for Model 1, plotted in Figure 3, are very much in line with the country differences described with the black solid lines in Figures 1 and 2. The major difference is that, after controls, Belgium is found in the middle of the country distribution, while it was near the top in women's relative earnings in the unadjusted distribution. This shift reflects the fact that

the female population of Belgium is very highly educated. After controlling for that, Belgium takes a middle place in the distribution.

In Model 2, we turn the focus to the key substantive variables of the study, educational pairing and motherhood status. Mothers have lower relative earnings than childless women: on average across countries they earn about 23% less than their male partners (–0.232, standardized to the country-specific male average). The parameters for the educational pairings are consistent with Hypothesis 1: net of the control variables and motherhood status, women in hypogamous unions have almost 14% higher relative earnings than those in homogamous ones and about 28% higher than the women in hypergamous couples.

The results shown in Model 3 for the interaction between motherhood and educational pairings are consistent with Hypothesis 2. The motherhood effect on relative earnings is significantly smaller for women in hypogamous unions compared to homogamously paired peers: the difference is about 7 percentage points (as implied by parameter estimate 0.074 in Model 3) and statistically significant at the $p<0.01$ level. The same interaction can also be considered the other way around: the hypogamy bonus on relative earnings is about 7 percentage points larger for mothers than for childless women. Adding up the effects of educational pairings and the interactions with motherhood, the differences in predicted values are quite substantial. For mothers in hypogamous unions, the predicted relative earnings are about -10% (-0.254 + 0.080 + 0.740 = -0.100, all other variables at their reference levels), while this is about -25% for mothers in homogamous unions and -39% for mothers in hypergamous unions (-0.254-1.154+0.015=-0.393). We have no clear evidence in support of the second part of Hypothesis 2, which is about the difference between hypergamous and homogamous women: the difference in motherhood effect between these two groups is statistically not significant. In additional tests not reported here, we

also distinguished between couples with children below and those with children above age 5, but this hardly made a difference for the estimates and does not affect our conclusions. The negative motherhood effect is stronger when the youngest child is below age 5, but the interaction with hypogamy stays the same.

<FIGURE 3 Point estimates of country fixed effects in models Model 1 – Model 4 in Table 2, about here>

So far, we have seen that women's relative earnings are a function of their absolute and relative education, motherhood status, and the interaction between the latter two variables. International differences in relative earnings may therefore be due to the fact that these variables are differentially distributed in different countries. The country effects plotted in Figure 3 address this issue. These reflect the residual country differences in women's relative earnings after accounting for the other variables in the model. The country effects from Model 3 are considerably closer to the zero line than the ones from baseline Model 1, confirming that motherhood and (relative) education are important reasons why women's relative earnings are generally lower than men's in all countries. However, accounting for these factors does not reduce the country gradient: the variability of unexplained country differences is not smaller for Model 3 compared to Model 1: the standard deviation of the country fixed effects in Model 3 is 0.0843, which is actually a bit larger than the one for Model 1 (0.0831).

Model 4 includes male unemployment with the expectation that this factor would account for some of the remaining cross country differentials (Hypothesis 3). Male unemployment is clearly associated with higher relative earnings on the micro-level: a month of unemployment of

the male partner is associated with an increase of 5% of the yearly relative earnings of the female partner. However, also this factor is not able to explain the country differences: the standard deviation for the residual country effects in Model 4 is 0.0854, not smaller than the one for the country effects in Model 3 (0.0843). Interestingly, all the residual country effects are more strongly negative in Model 4 than in Model 3. This indicates that the share of women's earnings in the joint couple income is elevated by male unemployment in all countries and that women's expected relative earnings are lower again after this factor has been accounted for. We illustrate this point by comparing Spain (ES) and Sweden (SE). These two countries are similar in the baseline rank ordering of women's relative income (Model 1). However, after accounting for male unemployment, the expected relative earnings of women are much lower in Spain than Sweden. The rank order based on Model 4 places Spain in a much lower position, somewhere between Italy and Poland. The reason is that the male unemployment rate in Spain is three times as high as in Sweden (see Table 1) which results in the comparably high relative earnings in Spain in the baseline ranking. In sum, male unemployment explains an important part of the gender earnings gap in all countries, and it explains part of the relative position between specific countries, but it cannot explain the overall country gradient in women's relative earnings.

Figure 4 plots our two country-level measures of conservative gender role attitudes against country specific estimates of the effect of hypogamy compared to homogamy (upper panels) and hypergamy (lower panels). Hypothesis 4 is that the positive effect of hypogamy on women's relative earnings are lower in countries that exhibit more traditional gender norms. Yet, if anything, we rather find the opposite to be true, as indicated by the positive slopes of the lines in Figure 4: the more people tend to agree with these conservative statements about gender roles, the higher tends to be the positive effect of hypogamy. The correlations are weak, however, and most of them

are statistically not significant at the 5% or even 10% level. The only exception is the contrast between hypogamy and hypergamy in the lower left panel: the positive effect of hypogamy on women relative earnings compared to women in hypergamous unions correlates in a statistically significant way with the percentage agreeing (strongly) that women should be prepared to cut down on paid work for the sake of family ($r=0.56$, $p<0.04$). Again, against Hypothesis 4, the correlation is positive, not negative. Additional descriptive data explorations, depicted in Figure 5, suggest that the reason for the significant correlation in case of the contrast between hypogamy and hypergamy is the fact that hypergamous women tend to have lower relative earnings in countries that exhibit more conservative gender norms, while the country level correlation between gender norms and relative earnings is absent or much weaker for hypogamous women.

<FIGURE 4 Scatterplot and OLS regression line of country specific gender role attitudes (horizontal axis) and country specific effects of hypogamy compared to other educational pairings (vertical axis), about here>

<FIGURE 5 Observed country specific average relative earnings by educational pairing and country level gender role attitudes>

Conclusion

The reversal of the gender gap in education represents a major social development, not just in the West but also in many other regions of the world (Esteve et al. 2016). It has potentially wide-ranging implications for gender roles, including female and male economic roles in the family. The

aim of this paper was to investigate to what extent international differences in women's relative earnings could be explained by couple level gender differences in educational attainment and their interaction with parenthood status. We also investigated male unemployment and attitudes about gender roles as additional candidates to explain country differences. Based on EU-SILC data on net earnings of partnered men and women in 16 European countries, we found considerable heterogeneity in women's relative income, even though women on average earned less than their male partners in all countries.

As a baseline, we examined educational pairings and found that women who are more educated than their male partners have higher relative earnings in all countries included. Next, considering the reversed gender gap in education led us to hypothesize that the negative association between motherhood and relative earnings would be weaker for women who are more educated than their male partners, compared to women who have the same or a lower attainment level than him. Indeed our results indicate that the motherhood penalty on relative earnings is weaker for hypogamous women than for women in other pairing types and further implies that the hypogamy bonus on women's relative earnings is stronger for mothers than for childless women.

Shifting attention to the macro-level, we find that neither the country distributions of women's absolute and relative education, nor differences in motherhood status and their interaction with relative education can explain the country heterogeneity in women's relative earnings. Additional analyses showed that male unemployment has a positive effect on women's relative earnings in all countries, but it cannot explain the remaining country heterogeneity of those earnings. Male unemployment helps accounting for why women's relative earnings tend to be higher in some particular countries compared to others (much in line with recent findings by Vitali

and Arpino 2016), but the unexplained variance in country differences remains just as high as before unemployment is accounted for.

Turning to cultural factors, we examined the association between the country specific effects of hypogamy on women relative earnings and two country-level measures of prevailing attitudes about gender roles regarding women's position in the labor market. Our expectation was that the positive effect of hypogamy on relative earnings would be more limited in countries where conservative attitudes towards gender roles prevail. Yet, if anything, we found the opposite to be the case. The rationale for our hypothesis was that conservative gender norms may hinder well educated women to cash the returns to their degrees in the labor market but apparently this is not the case. Instead, we find that conservative norms rather hinder the earnings of *less* educated, hypergamous women. The more educated, hypogamous women are not really bothered by traditional gender norms that may prevail in their country: for them, there is no or only a weak association between their relative earnings and country level gender role attitudes, while less educated, hypergamous women clearly earn less (compared to their partners) in countries with traditional attitudes. Yet, our macro-level correlations should not be considered as conclusive evidence: not only are our tests based on a limited number of countries, our sample-based measures of gender role attitudes also obviously contain a measurement error component.

Apart from that, our study has other important limitations. First, the number of countries in the study sample was limited to 16 because the data for the other European countries did not include information on net income. Given the important differences between European countries in fiscal arrangements, it was important to use a net income measure to evaluate international differences in women's relative contribution to the joint disposable income. This requirement reduced the number of countries to a level that precluded robust estimation of multilevel models. For the

analysis of gender role attitudes, we were further limited to 14 countries thus undermining the statistical power of our macro-level analysis.

A second limitation is that we have only examined the educational attainment level of male and female partners. Information on their respective *fields* of education was not available in our data set. However, the field of study clearly has strong implications for the earning potential in the labor market for women and men and is strongly related to the transition to motherhood as well as to attitudes about gender roles (Van Bavel 2010). Choice of study disciplines along gender-stereotypical lines might explain why women often earn less than their partners even in hypogamous couples. Third, the reported associations between educational pairings and women's share in the family income cannot be interpreted as pure causal effects. The selection into union, union type and motherhood status are likely to be correlated with women's earnings and educational level (Dribe and Nystedt 2013). Our results therefore reflect both selection and causal effects.

Nevertheless, the micro-level findings from this study are very robust. They have important implications for family demography, regardless of whether they reflect causal or selection effects. The rising prevalence of hypogamy, the decline of hypergamy, and high male unemployment mean that women's earnings represent a growing share of the joint couple income. This is bound to affect the couple's negotiations about the division of paid and unpaid work and, hence, their decision making about the timing and quantum of fertility (Goldscheider et al. 2015; Esping-Andersen & Billari 2015).

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Tables

Table 1 Sample size and distribution of main variables by country

	N	Her education			Her relative education			She is mother	Her mean relative earnings	Man's unem-ploy-ment	Her mean age	ESS-based gender attitudes	
		Low	Mid	High	Same	Lowe	Higher					a)	b)
		%	%	%	%	%	%	%		months	years	%	%
AT	2,953	17.6	61.5	20.8	64.1	22.7	13.2	79.9	–0.55	0.7	36.1	39.8	20.6
BE	2,663	9.7	37.7	52.6	59.7	13.1	27.1	73.1	–0.37	0.6	35.2	33.9	24.2
BG	2,271	20.4	51.7	27.9	72.7	8.8	18.5	89.8	–0.38	1.4	35.3	49.0	34.1
EE	2,296	8.0	45.1	46.9	58.4	11.4	30.1	85.4	–0.52	0.9	34.7	55.5	30.5
ES	5,865	34.4	25.5	40.1	57.3	15.9	26.8	74.2	–0.42	0.9	36.2	50.2	22.6
FR	4,829	13.6	43.7	42.7	57.8	15.1	27.1	79.6	–0.38	0.7	34.8	47.5	23.6
GR	2,577	25.2	46.9	27.9	64.1	14.2	21.7	86.1	–0.53	0.7	36.4	52.7	46.2
IT	8,360	37.2	46.3	16.5	58.9	15.1	26.0	80.7	–0.54	0.6	36.5	67.2	49.0
LT	1,712	5.9	50.1	44.0	64.7	10.2	25.0	89.6	–0.38	1.0	35.4	77.9	28.2
LU	2,941	30.0	35.0	35.0	65.2	15.3	19.5	77.0	–0.48	0.4	35.8	60.6	24.9
LV	1,833	10.5	54.0	35.5	60.0	11.0	28.9	87.4	–0.41	1.1	35.0		
PL	6,473	5.4	63.1	31.6	74.7	8.0	17.4	87.0	–0.44	0.6	35.0	57.4	35.5
PT	1,968	58.9	21.4	19.7	68.8	8.3	23.0	85.9	–0.34	0.6	35.9	61.5	32.8
RO	3,356	23.5	61.0	15.5	75.9	16.0	8.1	84.5	–0.46	0.3	35.3		
SE	3,372	5.5	47.0	47.5	61.4	12.1	26.4	81.3	–0.33	0.3	35.2	20.0	6.9
SI	4,823	12.5	56.1	31.4	60.3	13.8	25.8	89.8	–0.23	0.5	36.2	42.8	20.4

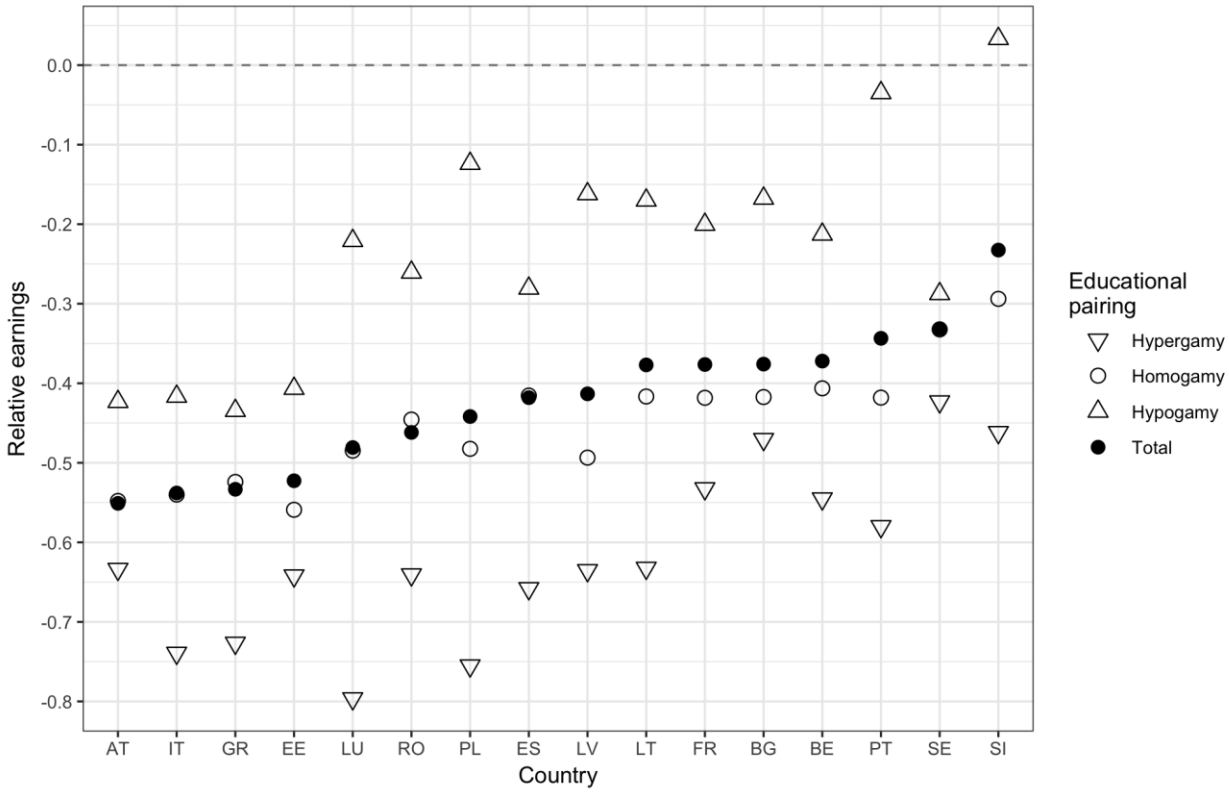
Notes: ESS-based variables are a) – percentages agreeing or strongly agreeing with "Women should be prepared to cut down on paid work for sake of family" and b) percentages agreeing or strongly agreeing with "Men should have more right to job than women when jobs are scarce".
Source: EU-SILC 2007 and 2011, own calculations, sample weights used for calculation of distributions, 2007 and 2011 data pooled.
Country codes: AT=Austria, BE=Belgium, BG=Bulgaria, EE=Estonia, ES=Spain, FR=France, GR=Greece, IT=Italy, LT=Lithuania, LU=Luxembourg, LV=Latvia, PL=Poland, PT=Portugal, RO=Romania, SE=Sweden, SI=Slovenia

Table 2 Estimates of linear regression model: Effects on women's relative earnings

	Model 1	Model 2	Model 3	Model 4
Age	-0.000	0.004	0.004	0.004
	(0.003)	(0.003)	(0.003)	(0.003)
Age Squared	0.000*	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Her Education (ref.=medium)				
Low	-0.101***	-0.014	-0.013	-0.027**
	(0.013)	(0.008)	(0.008)	(0.008)
High	0.223***	0.141***	0.141***	0.143***
	(0.035)	(0.028)	(0.028)	(0.027)
Couple Income Quartile (ref.=1)				
2	-0.130**	-0.127**	-0.127**	-0.065
	(0.040)	(0.038)	(0.038)	(0.036)
3	-0.130*	-0.123*	-0.123*	-0.045
	(0.048)	(0.047)	(0.047)	(0.042)
4	-0.407***	-0.374***	-0.374***	-0.290***
	(0.053)	(0.049)	(0.049)	(0.046)
Income Year 2010 (ref.=2006)	0.047**	0.044**	0.044**	0.021
	(0.012)	(0.012)	(0.012)	(0.013)
Mother (ref.=childless)		-0.232***	-0.254***	-0.241***
		(0.018)	(0.022)	(0.021)
Educational Pairing (ref.=homogamy)				
Hypogamy		0.137***	0.080***	0.085***
		(0.021)	(0.015)	(0.017)
Hypergamy		-0.141***	-0.154***	-0.132***
		(0.018)	(0.030)	(0.032)
Interaction Terms				
Mother*Hypogamy			0.074**	0.061*
			(0.022)	(0.022)
Mother*Hypergamy			0.015	0.005
			(0.019)	(0.021)
Man's Unemployment Months				0.051***
				(0.005)
Constant	-0.453***	-0.250***	-0.232***	-0.322***
	(0.021)	(0.026)	(0.028)	(0.022)
N	58,292	58,292	58,292	58,246
R^2	.054	.076	.077	.105

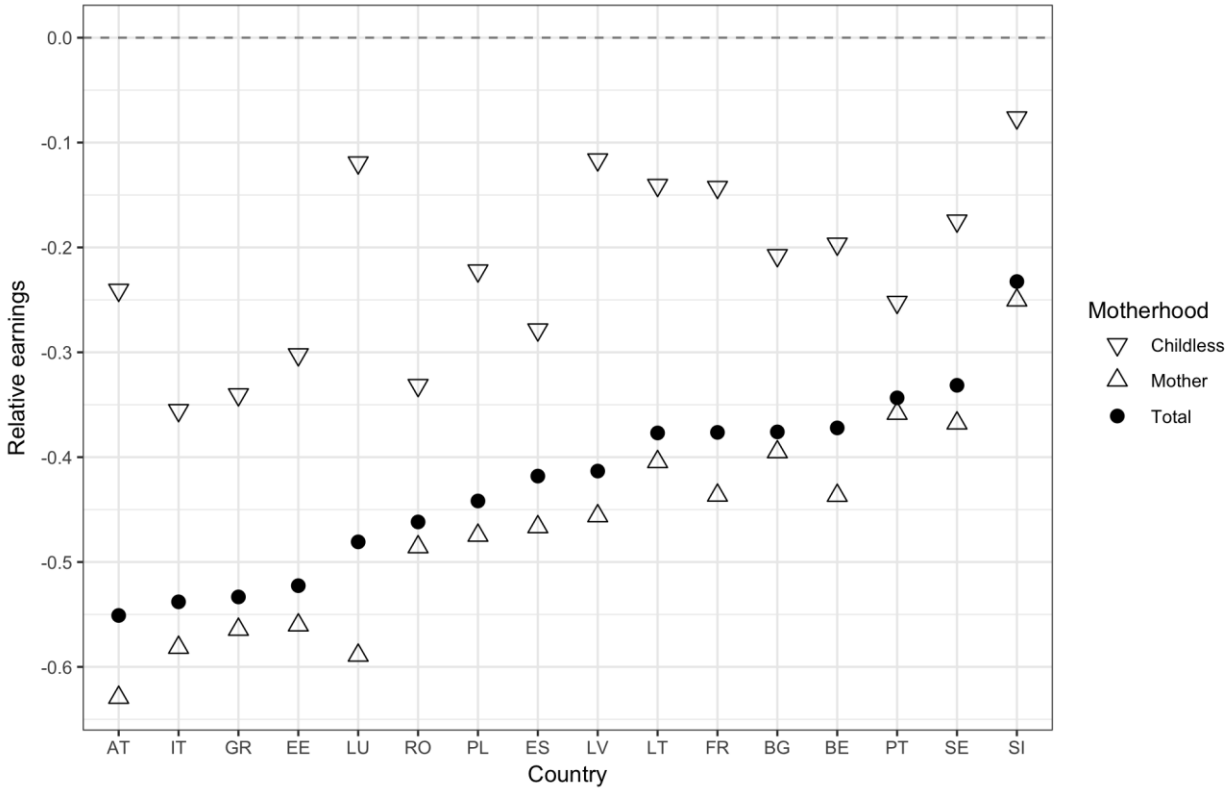
Notes: Standard errors in parentheses; country cluster robust standard errors and sample weights applied. Country effects shown in Figure 3.
Source: EU-SILC 2007 and 2011, own estimation.
* < .05; ** < .01; *** < .001

Figure 1 Mean relative earnings of women by educational pairing and country



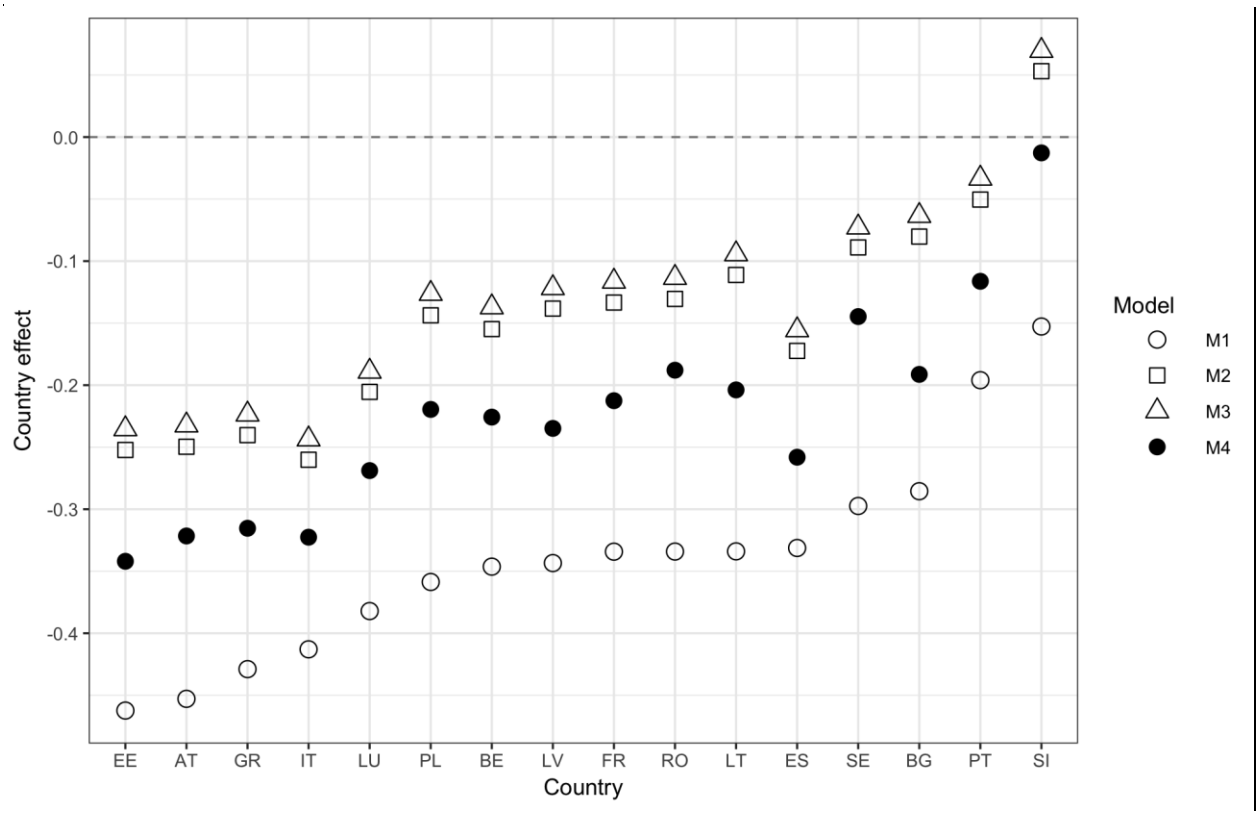
Source: EU-SILC 2007 and 2011, pooled sample, sampling weights, own estimation
Country codes: AT=Austria, BE=Belgium, BG=Bulgaria, EE=Estonia, ES=Spain, FR=France, GR=Greece, IT=Italy, LT=Lithuania, LU=Luxembourg, LV=Latvia, PL=Poland, PT=Portugal, RO=Romania, SE=Sweden, SI=Slovenia

Figure 2 Mean relative earnings of women by motherhood status and country



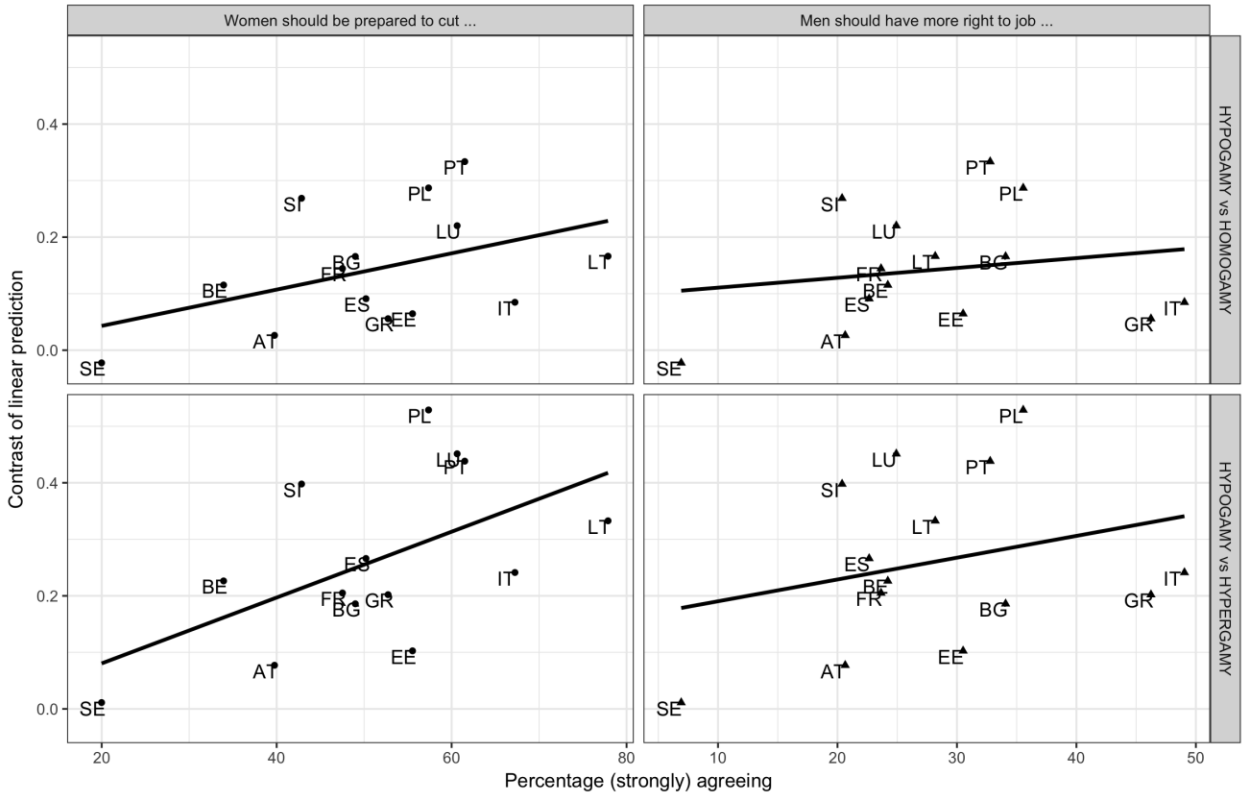
Source: EU-SILC 2007 and 2011, pooled sample, sampling weights, own estimation
Country codes: AT=Austria, BE=Belgium, BG=Bulgaria, EE=Estonia, ES=Spain, FR=France, GR=Greece, IT=Italy, LT=Lithuania, LU=Luxembourg, LV=Latvia, PL=Poland, PT=Portugal, RO=Romania, SE=Sweden, SI=Slovenia

Figure 3 Point estimates of country fixed effects in models Model 1 – Model 4 in Table 2



Note: countries ordered by country fixed effects from Model 1
Country codes: AT=Austria, BE=Belgium, BG=Bulgaria, EE=Estonia, ES=Spain, FR=France, GR=Greece, IT=Italy, LT=Lithuania, LU=Luxembourg, LV=Latvia, PL=Poland, PT=Portugal, RO=Romania, SE=Sweden, SI=Slovenia

Figure 4 Scatterplot and OLS regression line of country specific gender role attitudes (horizontal axis) and country specific effects of hypogamy compared to other educational pairings (vertical axis)



Notes: Horizontal axis is percentage agreeing with the statement "Women should be prepared to cut down on paid work for sake of family" (left panel) and with "Men should have more right to job than women when jobs are scarce" (right hand panel). Each vertical axis represents the country specific effect of hypogamy, compared to homogamy (upper panels) and hypergamy (lower panels)
Country codes: AT=Austria, BE=Belgium, BG=Bulgaria, EE=Estonia, ES=Spain, FR=France, GR=Greece, IT=Italy, LT=Lithuania, LU=Luxembourg, LV=Latvia, PL=Poland, PT=Portugal, RO=Romania, SE=Sweden, SI=Slovenia

Figure 5 Observed country specific average relative earnings by educational pairing and country level gender role attitudes